

IGEM/SR/29
Communication 1760

Dealing with gas escapes



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Royal Charter 1929
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SECTION 1 : INTRODUCTION

- 1.1 This Standard supersedes IGE/SR/10 Edition 2, Communication 1660, which is obsolete. This Standard supersedes IGE/SR/20 Edition 2, Communication 1650, which is obsolete.

This Standard has been drafted by a Panel appointed by the Institution of Gas Engineers and Managers' (IGEM's) Gas Transmission and Distribution Committee, subsequently approved by that Committee and published by the authority of the Council of IGEM.

- 1.2 This Standard provides requirements for gas transporters (GTs), gas conveyors, shippers, suppliers and information for the likes of local authorities, plant operators, utilities and emergency services on the responsibility, methods and personnel involved in dealing with a gas escape.

- 1.3 The requirements detailed in this Standard are based on current practices within Great Britain (GB).

Note: The protection of life and property are given priority throughout this Standard.

- 1.4 The relevant parts of this Standard may be cited in a GT's/gas conveyors safety case, but the Health and Safety Executive (HSE) will need to be satisfied that they are appropriate and have been properly applied in each case.

- 1.5 This Standard makes use of the terms "must", "shall" and "should" notwithstanding Sub-Section 1.7,

- the term "must" identifies a requirement by law in GB at the time of publication
- the term "shall" prescribes a requirement which, it is intended, will be complied with in full and without deviation
- the term "should" prescribes a requirement which, it is intended, will be complied with unless, after prior consideration, deviation is considered to be acceptable.

Such terms may have different meanings when used in legislation, or HSE Approved Code of Practice (ACoPs) or guidance, and reference needs to be made to such statutory legislation or official guidance for information on legal obligations.

- 1.6 The primary responsibility for compliance with legal duties rests with the employer. The fact that certain employees, for example "responsible engineers" are allowed to exercise their professional judgement does not allow employers to abrogate their primary responsibilities. Employers must:
- have done everything to ensure, so far as is reasonably practicable, that there are no better protective measures that can be taken other than relying on the exercise of professional judgement by "responsible engineers"
 - have done everything to ensure, so far as is reasonably practicable that "responsible engineers" have the skills, training, experience and personal qualities necessary for the proper exercise of professional judgement
 - have systems and procedures in place to ensure that the exercise of professional judgement by "responsible engineers" is subject to appropriate monitoring and review
 - not require "responsible engineers" to undertake tasks which would necessitate the exercise of professional judgement that is not within their competence. There should be written procedures defining the extent to which "responsible engineers" can exercise their professional judgement. When "responsible engineers" are asked to undertake tasks which deviate from this they should refer the matter for higher review.
- 1.7 Notwithstanding Sub-Section 1.5, this Standard does not make obligatory the use of any method or specification against the judgement of the "responsible engineer". New and improved practices may be adopted prior to this Standard being updated. Amendments to this Standard will be issued when necessary and their publication will be announced in the Journal of IGEN and elsewhere as appropriate.
- 1.8 It is now widely accepted that the majority of accidents in industry are in some measure attributable to human as well as technical factors in the sense that people's actions initiated or contributed to the accidents or people might have acted better to avert them.
- It is therefore necessary to give proper consideration to the management of these human factors and to the control of risk. To assist in this, it is recommended that due cognisance be taken of HSG48 and HSG65.
- 1.9 Requests for interpretation of this Standard in relation to matters within its scope, but not precisely covered by the current text, should be addressed in writing to Technical Services, IGEN, IGEN House, High Street, Kegworth, Derbyshire, DE74 2DA and will be submitted to the relevant Committee for consideration and advice, but in the context that the final responsibility is that of the engineer concerned. If any advice is given by or on behalf of IGEN, this does not relieve the responsible engineer of any of his or her obligations.
- 1.10 This Standard was published in May 2012.

SECTION 2 : SCOPE

- 2.1 This Standard sets out the requirements for dealing safely with gas escapes.
- 2.2 Primarily, this Standard deals with gas escapes from Natural Gas (NG) piped supplies and systems.
- Note 1: In general, the Standard will not always be appropriate for escaped fuel that remains in a liquid phase, when further or alternative requirements may need to be applied. The Gas Safety (Management) Regulations (GS(M)R) lay down statutory requirements for dealing with reported NG escapes, which include escapes of carbon monoxide (CO). This Standard does not deal with the technical issues involved with reported CO "incidents", nor do the non-technical sections mention CO. However, the principles outlined in the non-technical sections apply to dealing with reported CO "incidents". Further information is provided in IGE/GL/8.*
- Note 2: This Standard only deals with unignited gas escapes.*
- 2.3 This Standard covers the actions to be taken by organisations and staff that may, in the normal course of their duties, be involved in the detecting and/or dealing with gas escapes. Particular attention is drawn to the requirement for competency outlined in Sub-Section 4.6.
- 2.4 This Standard covers the requirements to take action from the identification of a gas escape to make the incident safe along with appropriate notification to the relevant parties including the HSE.
- 2.5 All pressures are gauge pressures unless otherwise stated.
- 2.6 Italicised text is informative and does not represent formal requirements.
- 2.7 Appendices are informative and do not represent formal requirements unless specifically referenced in the main sections via the prescriptive terms "must", "shall" or "should".

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SECTION 3 : LEGAL AND ALLIED CONSIDERATIONS

3.1 GENERAL

- 3.1.1 This Standard is set out against a background of legislation in force in GB at the time of publication. The devolution of power to the Scottish, Welsh and Northern Ireland Assemblies means that there may be variations to the legislation described below for each of them and consideration of their particular requirements must be made. Similar considerations are likely to apply in other countries where reference to appropriate national legislation is necessary.

All relevant legislation must be applied and relevant ACoPs, official Guidance and referenced codes, standards, etc. shall be taken into account.

Note: Appendix 2 is relevant in this respect.

Health and safety legislation must be observed, especially those requirements which are concerned with the duties of employers, not only to their own employees, but also to members of the public who may be affected.

- 3.1.2 The legislation that mainly prescribes the requirements for dealing with gas escapes is the Gas Act and GS(M)R.
- 3.1.3 Unless otherwise stated, the current editions of legislation and standards apply.
- 3.1.4 In the absence of specific legislation, it is essential that installations are designed, constructed, installed, operated and maintained so as to be safe.
- 3.1.5 The legislation appropriate to any installation will depend largely upon its location. Advice will need to be sought from the relevant Authorities.
- 3.1.6 Where British Standards, etc. are quoted, equivalent national or international standards, etc. equally may be appropriate.

Care shall be taken to ensure that the latest editions of the relevant documents are used.

3.2 PRIMARY LEGISLATION

3.2.1 Gas Act

- 3.2.1.1 Public gas transporters (PGTs), that is those GTs who hold a licence under Section 7(2) of the Gas Act 1995 have special conditions imposed on them by their licence with regard to gas escapes (Standard Condition 18 refers).

- 3.2.1.2 Rights of entry for preventing escapes of gas etc. comes under schedule 2B of the Gas Act 1986, The Gas Code and Rights of Entry (Gas and Electricity Board) Act 1954 as amended:

Gas Act 1995 Schedule 2;
Paragraph 21 states:
'Suspected escapes of gas

- (1) *Where a public gas transporter has reasonable cause to suspect that gas conveyed by him which has escaped has entered, or may enter any premises, the transporter shall take any steps necessary to avert danger to life or property.*

- (2) *If a public gas transporter fails to comply with sub-paragraph (1) above, he shall be guilty of an offence and liable on summary conviction to a fine not exceeding level 3 on the standard scale.*
- (3) *In any proceedings for an offence under sub-paragraph (2) above it shall be a defence for the public gas transporter to prove that he took all such steps to avert danger to life or property as were reasonably practicable'.*

Paragraph 22 states:

'Entry for preventing escapes of gas etc

- (1) *Where a public gas transporter has reasonable cause to suspect:*
 - (a) *that gas conveyed by him is escaping, or may escape, in any premises; or*
 - (b) *that gas so conveyed which has escaped has entered, or may enter, any premises, any officer authorised by the transporter may, on production of some duly authenticated document showing his authority, enter the premises, inspect the gas fittings, carry out any work necessary to prevent the escape and take any other steps necessary to avert danger to life or property.*
- (2) *Where a public gas transporter has reasonable cause to suspect:*
 - (a) *that gas conveyed through pipes by some other person is escaping, or may escape, in any premises in an authorised area of his; or*
 - (b) *that gas so conveyed which has escaped has entered, or may enter, any premises in such an area, any officer authorised by the transporter may, on production of some duly authenticated document showing his authority, enter the premises and take any steps necessary to avert danger to life or property.*
- (3) *In this paragraph any reference to any officer authorised by a public gas transporter includes a reference to any officer authorised by another such transporter with whom the transporter has made arrangements for officers authorised by the other transporter to discharge any functions of the transporter under paragraphs 20 and 21 of these Regulations'.*

3.2.2 **Health and Safety at Work etc. Act (HSWA)**

HSWA applies to all persons involved with work activities, including employers, the self-employed, employees, designers, manufacturers, suppliers, etc. as well as the owners of premises. It places general duties on such people to ensure, so far as is reasonably practicable, the health, safety and welfare of employees and the health and safety of members of the public who may be affected by the work activity.

3.2.3 **New Roads and Street Works Act (NRSWA)**

- 3.2.3.1 NRSWA prohibits (under Section 51) any work being undertaken to place an apparatus in a street or to break up or open a street, or a sewer, drain, or tunnel under it or tunnel or bore under a street, or of changing the position of apparatus or removing it other than in pursuance of a statutory right or a street works licence.

- 3.2.3.2 NRSWA further details (under Section 52) "emergency works" as works whose execution at the time when they are executed is required in order to put an end to, or to prevent the occurrence of, circumstances then existing or imminent (or which the person responsible for the works believes on reasonable grounds to be existing or imminent) which are likely to cause danger to persons or property.
- 3.2.3.3 NRSWA details (under Section 57) the requirements to notify the Local Authority of the "emergency works" by a 'Notice':
- an undertaker executing emergency works shall give notice as soon as reasonably practicable, and in any event within two hours (or such other period as may be prescribed) of the works being begun, to the persons to whom notice would be required to be given under that section and
 - the notice shall state his intention or, as the case may be, the fact that he has begun to execute the works and shall contain such other information as may be prescribed
 - an undertaker who fails to give notice in accordance with this section commits an offence and is liable on summary conviction to a fine.
- 3.2.3.4 NRSWA requires that training and competency assessments are carried out for those who work on the highway.
- 3.2.3.5 Under the Traffic Management Act (TMA), Local and Highway Authorities have introduced Permitry schemes, each with their own set of guidance and requirements. These Permitry schemes should be consulted and complied with wherever they are in place prior to carrying out works which the schemes encompass on designated roads within the Local or Highway Authorities area.

3.3 **SECONDARY LEGISLATION**

3.3.1 **Confined Spaces Regulations**

These Regulations apply to a whole range of confined spaces. The supplier or designers of an enclosure and equipment within it is required to perform a risk assessment of the enclosure with respect to safe access and egress and to give clear instructions to operators on access/egress as well as to what actions to take in the event of a gas alarm occurring. Employers and the self employed should prevent entry into confined spaces unless avoidance is not reasonably practicable and unless there is a system of work which renders the work safe. They are also required to have specific emergency arrangements in place.

3.3.2 **Control of Substances Hazardous to Health Regulations (COSHH)**

These Regulations require employers to assess the health risks associated with the use of and exposure to substances which are hazardous to health. Primarily, they relate to health and safety at work but chemical data gathered for COSHH may also be useful when assessing environmental effects.

COSHH require:

- a written risk assessment prior to using substances which may be hazardous to health
- consideration to the properties, health effects and form of these substances. Various amendments have required specific attention be given to carcinogens, asthmogens and biological agents.

The 2004 amendments implement a new framework for occupational exposure limits and bring together eight principles of good practice.

3.3.3 Electricity at Work Regulations

These Regulations apply to a wide range of electrical work, from overhead power lines to the use of office computers and batteries and include work on gas equipment using electrical energy.

The Regulations are concerned with the prevention of danger from electric shock, electric burn, electrical explosion or arcing or from fire or explosion initiated by electrical energy.

The Regulations impose duties on every employer, employee and self-employed person and require that persons engaged in electrical work be competent or be supervised by competent persons.

Note: HSR25 provides guidance on the Regulations.

3.3.4 Gas Safety (Installation and Use) Regulations (GS(I&U)R)

3.3.4.1 GS(I&U)R are relevant statutory provisions of HSWA setting out general and detailed requirements dealing with the safe installation, maintenance and use of gas systems, including gas fittings, appliances and flues.

Note: GS(I&U)R do not apply to certain premises (see HSL56 Guidance Notes 28 and 29). However, where they do not apply, the principles of GS(I&U)R need to be applied, notwithstanding that the requirement for Gas Safe Registration need not be applied.

3.3.4.2 GS(I&U)R address both Natural Gas and LPG.

3.3.4.3 GS(I&U)R place responsibilities on those installing, servicing, maintaining or repairing gas appliances, pipework etc. as well as suppliers and users of gas.

3.3.4.4 GS(I&U)R define the gas supplier for both Natural Gas and LPG. HSL56 provides guidance on those definitions, in particular for the more complicated case of LPG supplied from storage vessels and from cylinders.

3.3.4.5 GS(I&U)R define the type of work that requires persons carrying out such work, or their employers, to be an "approved class of person". In the GB this means registration under the Gas Safe Register scheme.

3.3.4.6 The gas operative must check the safety of any appliance or pipework they install or work on and take appropriate action where they find faults. Where the premises are let or hired out, the landlord or hirer has special responsibilities to ensure that any operative they use for the gas fitting, service or maintenance of safety is a member of an approved class of persons (see clause 3.3.4.5) and is competent to carry out such work. If any serious fault is found, the operative must inform both the landlord/hirer, as well as the user, so that such faults can be rectified before further use. Reference shall be made to the requirements contained in the Gas Industry Unsafe Situations Procedures (details are available through Gas Safe Register).

Note: Operatives working for ESPs may have limited responsibilities in this area.

3.3.4.7 GS(I&U)R place responsibilities on LPG suppliers to deal with escapes of LPG. For Natural Gas, GS(M)R apply (see Sub-Section 3.3.5).

Note: Further advice on GS(I&U)R is provided in HSL56.

3.3.5 Gas Safety (Management) Regulations (GS(M)R)

3.3.5.1 These Regulations are intended to cover the transport of NG to the public. They do not cover gases such as LPG, coke oven gases etc (see HSL80 Regulation 2(1)).

3.3.5.2 Regulation 8 of GS(M)R places an obligation on GTs/gas conveyors not to convey gas in a network unless the gas conforms with the requirements of Part I of Schedule 3 of the Regulations (include a stenching agent) except that this paragraph shall not apply where the gas is at a pressure above 7 bar.

3.3.5.3 GS(M)R (Regulations 7(4); 7(5) and 7(10)) place specific duties on GTs/gas conveyors, or their emergency service providers (ESPs), for dealing with gas escapes from pipes on their networks. Their primary duty is to make the situation safe. They are responsible not only for dealing with escapes from their own pipes, but also for dealing with escapes from gas fittings supplied with gas from pipes on their network. In GS(M)R, the term "gas escapes" includes escapes or emissions of CO from a gas fitting.

Where a gas escape is confirmed following the report of a gas escape, GS(M)R require that the gas escape should be prevented within 12 hours of receipt of the initial reported escape. However, GS(M)R allow a GT/gas conveyor a defence to this duty on the grounds of reasonable practicability (see HSE SPC/Enforcement/140). If the gas conveyor is able to prove that this defence applies to a gas escape, the work necessary to prevent it may be deferred beyond 12 hours.

The principles that a GT/gas conveyor should consider when determining whether or not to defer the prevention of a gas escape beyond 12 hours are:

- genuine problems were encountered when attempting to locate the escape
- difficulties were experienced in gaining access to the location of the escape, either by geography or by other risks such as fire, explosion, building instability, roads and traffic etc
- the size and/or complexity of the escape meant that a repair could not be completed within 12 hours
- there was unforeseen demand on first call operatives and escape, locate and repair (ELR) teams at the time of the gas escape in question
- ELR resources were diverted to other more serious and immediate risks that arose at the same time as the gas escape in question.

The above list is not exhaustive.

3.3.5.4 GS(M)R places a duty on National Grid Gas (Regulation 7) to:

- provide a continuously staffed national 0800 111 999 freephone number for use by the public, consumer and the emergency services in the event of a gas escape (gas escapes include actual or suspected emission of CO from gas appliances), or a fire or explosion where gas is suspected to have been involved and
- contact the relevant GT, or their ESP (where different), immediately when an emergency arises from a gas escape or suspected emission of CO.

3.3.5.5 There are also duties imposed on gas suppliers, ESPs and GTs to notify the person who has the responsibility for dealing with the escape should they receive a report of an escape from the consumer (Regulation 7(3) of GS(M)R).

3.3.5.6 GS(M)R require GTs to investigate gas related fire and explosion incidents downstream of the consumer's emergency control valve (ECV) and to send a report of the investigation to HSE. Regulation 7(12) states;

'Where an escape of gas from a gas fitting on domestic premises has resulted in a fire or explosion, the person conveying the gas in the part of the network immediately upstream of the emergency control for the supply of gas to that fitting shall, as soon as is reasonably practicable after receiving notice of the fire or explosion, cause an investigation to be carried out so as to establish, so far as is reasonably practicable, whether the escape was from installation pipework or from an appliance, and if so which, appliance'.

The responsibility for investigating CO poisoning incidents from incomplete combustion is placed on gas suppliers (see Regulation 7(14)). HSE must be notified before such investigations commence. GS(I&U)R place legal duties on LPG suppliers to deal with escapes of LPG.

3.3.6 **Management of Health and Safety at Work Regulations (MHSWR)**

MHSWR impose a duty on employers and the self-employed to make assessments of risks to the health and safety of employees, and non-employees affected by their work. They also require effective planning and review of protective measures.

3.3.7 **Pipelines Safety Regulations (PSR)**

PSR provides a means of securing pipeline integrity by ensuring that a pipeline is designed, constructed and operated safely. They apply to all Network pipes operated by a GT. Installations can vary in size and complexity, and installation designers need to give due consideration to the operating pressure (OP) and required gas flows.

Note: HSL81 provides an ACoP and guidance and HSL82 provides guidance on PSR.

In particular, PSR require that the operator ensures no fluid is conveyed in a pipeline unless the pipeline has been designed so that, as far as is reasonably practicable, examination and maintenance may be carried out safely. PSR also require that the operator ensures that a pipeline is maintained in an efficient state, in efficient order and in good repair.

Under (PSR), any person operating a gas pipeline at gauge pressures exceeding 7 bar has additional requirements imposed on them with regard to emergencies such as loss of integrity. Reference must be made to the Regulations.

3.3.8 **Pressure Systems Safety Regulations (PSSR)**

3.3.8.1 PSSR impose duties on designers, importers, suppliers, installers and user or owners to ensure that pressure systems do not give rise to danger. This is done by the correct design, installation and maintenance, provision of information, operation within safe operating limits and, where applicable, examination in accordance with a written scheme of examination drawn up or approved by a competent person (as defined by PSSR).

3.3.8.2 Relevant fluids for the purpose of this document would be natural gas at a pressure greater than 0.5 bar above atmospheric pressure. A pressure system would include bulk storage tanks, pressure vessels, pipelines and protective devices. Once the pressure in the pipework drops below 0.5 bar, and the user/owner can show clear evidence that the system does not contain, and is not liable to contain, a relevant fluid under foreseeable operating conditions, then that part of the system is no longer covered by PSSR. This is likely to be the case after the pressure relief valve associated with a pressure reducing valve which takes the pressure to below 0.5 bar, for example at the entry to a building.

3.3.8.3 Note the special requirements placed on protective devices in such systems (see para 110b of HSL122). PSSR also apply to pipelines and their protective devices in which the pressure exceeds 2 bar (see Schedule 1 part 1 item 5 of HSL122).

Note: More information is available in HSL122 and some information is presented in the HSE free leaflets INDG261 and INDG178.

3.3.9 **Personnel Protective Equipment Regulations**

3.3.9.1 These Regulations places duties on employers to ensure that work equipment is so constructed or adapted as to be suitable for the purpose for which it is used or provided and in selecting work equipment, every employer shall have regard to the working conditions and to the risks to the health and safety of persons which exist in the premises or undertaking in which that work equipment is to be used and any additional risk posed by the use of that work equipment.

3.3.9.2 There are also duties on employers to take measures to ensure that the exposure of a person using work equipment to any risk to his health or safety from any hazard is either prevented, or where that is not reasonably practicable, adequately controlled, for example intrinsically safe equipment being available as appropriate.

3.3.10 **Provision and Use of Work Equipment Regulations (PUWER)**

3.3.10.1 PUWER place duties on employers in relation to selection, suitability, maintenance, inspection, installation, instruction and training, prevention of danger and control of equipment.

Note: More information on PUWER can be found in HSL22. Free leaflets include INDG291 and INDG229.

3.3.10.2 The term 'work equipment' includes all fixed plant and machinery as well as portable tools for use at work. This includes gas/plant/cable detection equipment, digging tools, ladders, lifting equipment and hand tools.

3.3.11 **Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR)**

3.3.11.1 RIDDOR require employers, self employed people or those in control of work premises to report certain work related accidents, diseases and dangerous occurrences.

3.3.11.2 Other people have duties to report certain gas incidents which may not appear to be work related:

- death or major injury arising out of the distribution, filling, import or supply of NG or LPG should be reported by the conveyor for NG and the filler, importer or supplier for LPG
- dangerous gas fittings (as defined in RIDDOR) should be reported by a "member of a class of persons".

Note: Further information may be sought from IGE/GL/8 Reporting and investigation of gas related incidents.